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ABSTRACT

This paper describes the effectiveness of the WICAT (World Institute of Computer Assisted Teaching) instructional system at three schools in Dearborn, Michigan. The focus of the WICAT student achievement evaluation plan at Salina Elementary and Junior High Schools centered upon 1-year and 3-year student achievement in reading and mathematics. Students showed significant growth in both reading and mathematics during the 1987-1988 school year as measured by the Iowa Tests of Basic Skills, but the reading results were the same as occurred before WICAT. Mathematics grade equivalent gains, when compared to before WICAT, increased 50% for grade 2 students and 43% for grade 3 students. Salina grade 4 students also had about the same reading gains and significantly higher mathematics gains when compared to similar students in other schools who did not have WICAT instruction. Low achieving mathematics students appeared to show the greatest growth. While the Iowa Tests results did not report positive and significant achievement gains in reading, the Michigan Educational Assessment Program test results did show such gains as well as positive and significant results in reading. A separate research study showed statistically significant gains in student comprehension and algebra achievement at Fordson High School. An appendix describes the instructional programs which used WICAT, including a bilingual program for grades 2-6. (EW)

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EFFECTIVENESS OF A TEACHING TOOL FOR INDIVIDUALIZED INSTRUCTION: AN INTERACTIVE COMPUTER MANAGED SYSTEM, WICAT

NOVEMBER, 1985 THROUGH JUNE, 1988

A SPECIAL REPORT FOR THE
MICHIGAN EDUCATIONAL RESEARCH ASSOCIATION CONFERENCE
SHERATON INN
LANSING, MICHIGAN
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WICAT EVALUATION HIGHLIGHTS

1. Student and staff continue to have positive attitudes towards WICAT.

2. Grade two math gains increased 50 percent higher than achievement prior to WICAT.

3. Grade three math gains increased 43 percent higher than achievement prior to WICAT.

4. Low achieving math students received the greatest benefit from WICAT use with gains from 10 to 14 months.

5. Grade four students had significant math gains over three years compared to similar non-WICAT students.

6. Mastery of MEAP reading skills increased from 42.2 percent before WICAT to 54.8 percent after WICAT. In September, 1988, 62.0 percent attained mastery.

7. High school WICAT students had significant gains in reading comprehension and algebra.

EFFECTIVENESS OF A TEACHING TOOL FOR INDIVIDUALIZED INSTRUCTION:
AN INTERACTIVE COMPUTER MANAGED SYSTEM, WICAT
NOVEMBER, 1985 THROUGH JUNE, 1988

Since the installation of the World Institute of Computer Assisted Teaching (WICAT) system in November, 1985 at both Salina Elementary and Junior High School and Fordson High School, students and professional staff members have enthusiastically received and used it. Over 1,400 grade one through grade twelve Dearborn Public Schools students along with forty-two teachers have utilized the WICAT System during the 1987-88 school year.

WICAT PROJECT

The WICAT instructional system at Salina focused on reading and mathematics improvement for second, third and fourth grade students from November of 1985 to June of 1988. Each of the twenty-three teachers involved were given four twenty-five-minute weekly WICAT sessions to supplant regular classroom instructional time. Teachers were trained in the WICAT curricula and given opportunities to share ideas and strategies for utilizing the system over the three-year period. The evaluation information from Fordson was collected from two English and three mathematics teachers during the 1987-88 fall semester. Teacher training and enrichment opportunities at Fordson were similar to those at Salina.

COMMUNITY DESCRIPTION

Dearborn is a metropolitan industrial and service oriented community on the western boarder of Detroit. The population, according to the 1980 census, is nearly 98,000, with 98.8% classified as white. The federal census does not list the number of Arabs in Dearborn separately but a reliable estimate puts the figure at 11,000. A home language survey conducted by the Dearborn schools in 1982 showed that Arabic was spoken in the homes of two out of every ten students. Currently, Salina is 97% ethnically Arabic and Fordson High School is 60% Arabic. Income levels for a majority of residents is described as middle to lower-middle class.

EVALUATION DESIGN

The focus of the SALINA WICAT student achievement evaluation plan centered upon one-year and three-year student achievement in reading and mathematics. There is no casual relationship between the WICAT system and observed changes in student achievement. The results of the evaluation are generally attributed to the total reading and mathematics programs.

The establishment of experimental and control groups of students for research and evaluation purposes was not feasible because nearly all of the students at Salina School received WICAT instruction during the past three years.

The analysis of pre- post-student achievement data was made, whenever feasible, in regards to observed achievement growth compared to (a) prior achievement growth at Salina School, (b) normal achievement growth as revealed by national norms, (c) achievement growth of similar students in other Dearborn schools, (d) achievement levels as determined on the pretest, and (e) gender.

One-year student achievement analysis focused on gains from May, 1987 to May, 1988 for second, third and fourth grades. The three-year analysis was made on the group of current grade four students that received WICAT instruction for the longest time--since November, 1985.

The selection of WICAT curriculum as well as the level of placement into the curriculum was made by the professional judgment of their teacher and was, therefore, deemed as the most appropriate for the student. Consequently, no matter which WICAT curriculum the student received or the placement level of the student, the results of the WICAT evaluation would be generally attributed to the total reading and mathematics program.

WICAT EVALUATION RESULTS

The evaluation of the WICAT system focused on student and staff attitudes toward the computer-based instructional program as well as student achievement.

Enthusiasm for the WICAT system during the last three years was very high with three fourths of the students wanting to receive WICAT instruction again and would also recommend WICAT to their friends. Furthermore, about nine-out-of-ten teachers felt that WICAT instruction had a positive effect on the student learning and recommend the WICAT system to other teachers.

Student achievement results for Salina students who received WICAT instruction in both reading and mathematics during the 1987-88 school year showed significant growth in the areas of reading comprehension and mathematics as assessed by the Iowa Tests of Basic Skills. Their growth in reading, however, was the same as occurred before WICAT. Mathematics grade equivalent gains, when compared to before WICAT, increased 50 percent for grade two students from .8 to 1.2 (an increase of .4 over and above prior growth rates) and increased 43 percent for grade three students with gain scores from .7 to 1.0.

It is significant that these students who participated in the WICAT program had a growth rate similar to all students in the district instead of losing two or three grade equivalent months at the second and third grades.

The greatest achievement gains in math occurred with the low achieving students. There was no significant difference recorded on the basis of gender.

Salina grade four students who received WICAT instruction in reading from November, 1985 through June, 1988 and in mathematics for the last year had about the same reading gains and significantly higher mathematics gains when compared to similar students in other schools who did not participate in the WICAT program. The WICAT mathematics gain of 2.7 grade equivalent points was greater than non-WICAT students whose gains ranged from 2.1 to 2.5 and also greater than the district average of 2.5. This is a significant outcome regarding student mathematics achievement after receiving WICAT instruction.

While the ITBS results provide positive and significant achievement gains in mathematics, the Michigan Educational Assessment Program (MEAP) results show positive gains in reading.

Significant positive gains in the grade four MEAP reading were reported for Salina WICAT students, with positive gains in the MEAP mathematics. An increase of 18.3 and 19.8 percent mastery in reading skills occurred after one and one-half years and two years, respectively, of WICAT reading instruction. These MEAP reading gains were greater than similar students in other schools that did not have WICAT. The Salina WICAT math mastery level increased from an average of 72.0 before WICAT to an average of 78.2 after WICAT. With two years of WICAT, the math mastery level was 87.3 in the 1988 MEAP.

A separate research study was completed during the first semester of the 1987-88 school year with statistically significant student reading comprehension and algebra achievement at Fordson High School.

To summarize, students who received WICAT instruction had substantial growth in reading skills as assessed by the MEAP and had significant positive growth in mathematics as assessed by the ITBS. Low achieving mathematics students seem to have the greatest growth.

APPENDIX

INSTRUCTIONAL PROGRAM - SALINA

Bilingual Program - The bilingual program operates from the second to the sixth grades. The second grade is a self-contained classroom. Grades three through six operate as a resource room working on a pull-out basis with a teacher and an aide. They work in English, math, science and social studies as needed. When English language proficiency is achieved, the service is discontinued. Bilingual service normally lasts from six to eighteen months.

Special Reading Program - In 1985 a new first grade reading readiness program was under development at Salina. The program was designed to promote reading readiness by encouraging teachers to use school developed kits of materials built around primer reading units. Materials were developed by teachers and curriculum specialists around nine themes such as animals, shelter, sports, and health. The kits were fully utilized during the 1987-88 school year. A basal reading program by Harper-Row was also adopted. In 1983 Salina teachers were trained in the language experience approach to reading.

Mathematics - The math curriculum remained the same from 1985 through 1988.

Chapter I - The Chapter I services are delivered on a pull-out basis to small groups of students K-3. They receive 40 minutes weekly in reading or mathematics depending on identified needs. Preschool Chapter I students are in a self-contained classroom setting. Special Education - Learning-disabled students are serviced on a pull-out basis from their mainstreamed classrooms.

INSTRUCTIONAL PROGRAM - FORDSON

English - The tenth and eleventh grade students involved in the evaluation data were "C" track remedial reading students. The reading level for these students was at least two years below grade level using national norms.

Mathematics - The mathematics classes involved in the WICAT experiment were from a low to average ability mainstream classes.

WICAT CURRICULUM

The three curriculums used over the length of the study were:

Primary Reading - This program is designed for kindergarten through second grade students and contains 13 strands--letter match, letter find, picture story, letter sound, sight words, sight word sentences, sound patterns, picture sentences, word meanings, reading stories, many meanings and digging for meanings. There are 1,120 activities.

Reading Comprehension - The grades two through nine curriculum focuses on nine reading skills--deletion, inference, graph interpretation, comprehension monitoring, critical reading, word clue, revision, build-a-story and a CLOZE test. There are over 715 stories focusing on these skills.

Mathematics K-8 - This program with over 900 activities is drill and practice working with addition, subtraction, multiplication and division.

ADDITIONAL SCHOOL INFORMATION FOR THE 1987-88 SCHOOL YEAR

	Salina	Fordson
Student Enrollment	896	1835
Bilingual Services	735	295
Free or Reduced Lunch	583	248
Chapter I	34	---
Special Education (Self-contained)	10	19